DOCUMENT RESUME

ED 274 627 SP 027 953

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TITLE Microcomputer Competency, Elementary Education Program, Western Oregon State College.
PUB DATE Jun 86
NOTE 27p.
PUB TYPE Reports - Descriptive (141)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Computer Literacy; Elementary Education; Higher Education; *Microcomputers; *Preservice Teacher Education; *Teacher Education Curriculum
IDENTIFIERS Western Oregon State College

ABSTRACT

Western Oregon State College is developing a curriculum to provide its teacher education students with computer literacy skills for the region's elementary schools. Computer skills of both students and faculty have been targeted specifically for improvement. Faculty skills have been upgraded with special workshops, grant-supported coursework, individual study and increased access to computers and accompanying software. All disciplines on the campus have developed activities for students involving computers. All teacher education students are required to take the liberal arts core curriculum previous to their professional training, and computer literacy is required for graduation. Teacher education students recommended for certification must complete a group of courses designated as the teaching specialty; these courses reflect the curriculum areas of the elementary school and rest upon the foundation of the liberal arts core curriculum. This paper outlines course requirements for education students, and describes how requirements for computer literacy, and using the computer as a teaching tool, are met throughout the entire curriculum. A case study illustrating how computers are used at the kindergarten level is appended. (JD)

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MICROCOMPUTER COMPETENCY
ELEMENTARY EDUCATION PROGRAM
WESTERN OREGON STATE COLLEGE

Norman E. Koch

SP027953

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MICROCOMPUTER COMPETENCY
ELEMENTARY EDUCATION PROGRAM
WESTERN OREGON STATE COLLEGE

DR. NORMAN E. KOCH

June, 1986

Technology has an exciting role to play in the future of education. What will its role be? Will it finally enable and assist the teacher to assume the role of a true educator--guiding development and directing the learning process! A young child has a huge background of experience and affinity for electronic information. Yet upon entering school, a cultural shock is experienced! An adult presents information orally or in printed form. The child's favorable attitude towards technology is quickly tested. A steady barrage of workbooks, drills, and passive learning is the rule--interaction is the exception. The fast pace of technology is replaced by the drudgery of the workbook.

The technological breakthrough currently having the largest impact on American education is the microcomputer. Public schools have rapidly moved into the computing age as demonstrated by their purchasing practices. With the onset of the 1985-86 school year, more than half a million microcomputers have been installed in public school classrooms, computer learning centers, and administrative offices. Last year, the nation's schools spent over $250 million on computers - a 60% increase over 1983. It is anticipated that the number of school computers will top one million by 1989.[1] The following table illustrates the rapid growth in computer use in the public schools. [2]

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Year	Elementary	Junior High	
1981	11.1	25.6	(figures
1982	20.2	39.8	expressed in
1983	62.4	80.5	percentages)
1984	82.2	93.1	

Enrollment	Elementary	Junior High
Under 200	49.9	63.8
200-299	62.8	72.3
300-399	66.7	78.7
500-999	65.7	82.6
1,000+	64.3	86.2

This illustrates the virtual population explosion of computers that has taken place in schools. In both large and small schools, the use of microcomputers has mushroomed. Comparative data of higher education useage illustrates similar trends. About one fifth of all college students own computers, with the number expected to double in two years.[3] A computer on every desk is a remote dream, yet . . . The typical elementary school pupil spends 20 minutes per week on a computer, with secondary students spending 45 minutes weekly. These figures will continue to increase.

More important than the number of computers or the amount of time spent with computers is how they are used. Until recently, schools namely used computers as "electronic workbooks," allowing students to practice math and reading drills. But more schools are beginning to use computers as a tool to improve student writing, provide more access to information, and to facilitate learning. Higher education followed basically the same path of acquiring equipment, adopting the easy uses for record-keeping and drill, and finally using the computer to extend and enrich student learning.

Western Oregon State College (WOSC) has moved rapidly to provide its teacher education students with computer literacy skills for the region's elementary schools. Course offerings quickly expanded as did other programs throughout the nation. Twenty-six states now have some form of computer literacy requirements, while only twelve states have computer certification requirements for teacher candidates.[4] In 1976, only a few universities were offering computer courses to practicing and prospective teachers. Columbia University, in 1975, offered an M.A. program.[5] It was the only program in the nation at that time. Continued advances in personal computers have tremendously impacted teacher education at WOSC. Courses have been added, and the content, processes, and procedures in classes throughout the campus have been affected and revised.

The past few years have seen an infusion of funds from both state and federal levels to up-date technology on the Western campus. This has led to many changes in curriculum, teaching techniques, student services, and administration information management. Computer skills of both students and faculty have been targeted specifically for improvement. Faculty skills have been upgraded with special workshops, grant-supported coursework, individual study, and increased access to computers and accompanying software. Through these activities faculty were encouraged to utilize computers in their classroom teaching. All disciplines on the campus have developed activities for students involving them with computers. All levels, freshmen to graduate, have been included: Introductory students in science and music, upper-division students in teacher education, and graduate students in special education alluse computers in their coursework. Each academic department on campus

has participated, and all academic levels of students have been involved in specialized training programs.

LIBERAL ARTS CORE CURRICULUM (LACC)

Western Oregon State College is designated as a liberal arts college with special emphasis on the preparation of teachers. The general education curriculum of the college provides the basis for all students from teacher education to academic majors throughout the college. At Western this general education component is referred to as the Liberal Arts Core Curriculum or LACC. All students, regardless of their area of specialization, are required to complete the LACC requirements. These requirements are designed to foster certain knowledges, abilities, and attitudes which define the liberally educated person. Each student is expected to show that he has made some progress in his efforts to achieve liberal breadth as well as the mastery of a particular area of study before graduation, but each demonstrates this in his own unique way. An identifying characteristic of a liberally educated person is the ability and self-discipline to learn independently. This serves as the cornerstone or foundation of the teacher education program. Since all students are required to complete this portion of the curriculum, a computer literacy requirement was established early for all graduates of WOSC. For teacher education students, computer literacy was one way to extend access to information and therefore enable independent learning to occur. The following specific computer-related objectives are addressed in the LACC:

--THE STUDENT SHOULD DEVELOP AN APPRECIATION FOR THE COMPUTER AND ITS CAPABILITIES.

--THE STUDENT WILL DEVELOP KNOWLEDGE OF COMPUTER VOCABULARY.

--THE STUDENT WILL RECOGNIZE AND GIVE EXAMPLES OF THE COMPUTER AS A TOOL FOR STORING, PROCESSING, AND RETRIEVING INFORMATION.

--THE STUDENT WILL DEVELOP A FAMILIARITY WITH COMPUTER HARDWARE, COMPUTER SOFTWARE, AND COMPUTER PROCESSES.

--THE STUDENT WILL BE ABLE TO DISCUSS MORAL, PSYCHOLOGICAL, AND SOCIOLOGICAL ISSUES OF COMPUTING IN SOCIETY.

--THE STUDENT WILL EXPERIENCE USING COMPUTERS IN THE LEARNING OF SUBJECT MATTER.

These objectives are met in varying ways. Most students demonstrate mastery by completing a basic computer literacy course, its equivalent or demonstrate alternative competency. The course, Computers and Society (CS 101), is described as:

> This course provides an introduction to the computer's role in society during which the student will become familiar with current computer terminology and will operate an Apple Micro-computer as demonstrated by using a word processor, writing and running a simple program in BASIC, and running at least one other piece of software.

The past few years have seen more and more entering freshmen already possessing the knowledge and skills required in the LACC. These students may by-pass the required course and proceed directly to a more advanced course. The course syllabus for Computers and Society (CS 101), the initial required LACC course, is included in the Appendix.

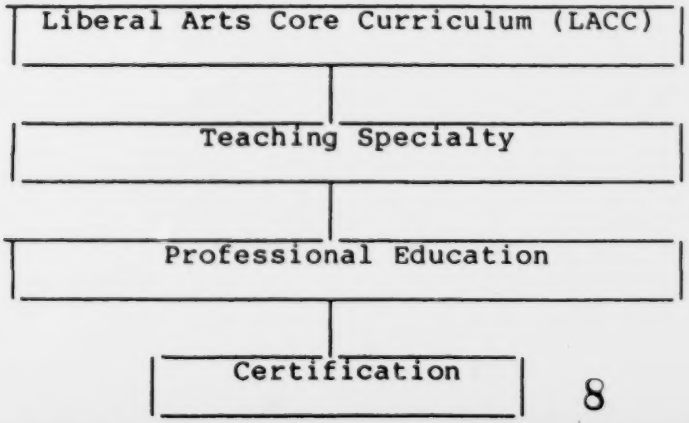
Students experience the application of microcomputers in all academic departments as they complete LACC requirements. Instructors throughout the campus utilize computer technology in an intriguing variety of ways. A recent survey (n=90) of elementary student teachers at WOSC gathered data on computer knowledge, use, and skills of the students as they progressed through the training program.

Specific, documented activities receiving notice included the use of Logo to design graphics in art courses, writing music and teaching musical notation in music, and word processing in writing courses. Health and physical education utilizes microcomputers to establish and maintain individual and group profiles for personal fitness and nutrition. Data retrieval and information searches in the library were noted. Mathematics and science utilized some instructional procedures to teach concepts, computations, and conduct experiments. Social science faculty, especially psychology, involved the students with software in a variety of ways to learn and practice skills.

In summary, all academic departments at WOSC provide students with an exposure to, and an experience with the technology of microcomputers. Faculty are continuing to seek ways to enhance their teachings, and therefore increase student learning and independence in learning.

THE TEACHING SPECIALTY

All students recommended for certification at WOSC must complete a group of courses designated as the teaching specialty. These courses reflect the curriculum areas of the elementary school and rest upon the foundation of the Liberal Arts Core Curriculum.



The above table demonstrates the relative placement of the teaching specialty in the preparation of elementary school teachers. This portion of the WOSC program is also taught in the academic departments by specialists, not by education faculty members. Additional objectives for students have been established for this portion of the elementary teacher education program. These objectives are:

--THE STUDENT WILL DEVELOP SKILL IN COMPUTER PROGRAMMING AND PROBLEM SOLVING.

--THE STUDENT WILL KNOW STEPS IN PROBLEM SOLVING WHERE SOLUTION IS A PROGRAM.

--THE STUDENT WILL BE ABLE TO INTEGRATE COMPUTERIZED TEACHING MATERIALS INTO CLASSROOM INSTRUCTIONAL ACTIVITIES.

--THE STUDENT WILL KNOW SOURCES OF INFORMATION ON COMPUTERS IN EDUCATION.

--THE STUDENT WILL BE ABLE TO EVALUATE THE APPROPRIATENESS AND EFFECTIVENESS OF INFUSING COMPUTERIZED MATERIALS INTO THE INSTRUCTIONAL PROGRAM TO MEET SPECIFIC CURRICULUM-BASED INSTRUCTIONAL OBJECTIVES.

--THE STUDENT WILL BE ABLE TO INTEGRATE EFFECTIVE COMPUTERIZED TEACHING MATERIALS INTO CLASSROOM INSTRUCTIONAL ACTIVITIES.

The following courses meet the requirements of the Teaching Specialty. Computer activities in this component of the elementary education program are based upon objectives identified in the LACC.

Art Education (Art 390)
School Health Program (Ed. 351)
P.E. in the Grades (PE 344)
Children's Literature (Eng. 480) -or-
Creative Dramatics (TA 240)
Earth, Biological, or Physical Science, 2 of 3
(S 311, 312, 313)
Math for Elementary Teachers (Mth 311)
Music for Elementary Teachers (Music 381)
Social Science for Elementary 3 of 4 (Ssc 301-304)

Students not only experience learning from microcomputers in many of these classes, they also began to develop wider experiences in the instructional uses of computers in the curriculum areas of the public school. However, both the quantity and quality of student's exposure varied greatly. This was not surprising due to instructor differences and interests. The major factor, however, was that no single course examined the issue or content area of computer literacy in the elementary schools. There was no systematic examination of a scope and sequence designed to teach elementary students about the use of computers. No examination of the curriculum for computer literacy was present.

To alleviate this deficiency, an elective course designed specifically for teachers was developed. The course description is:

> Survey of instructional uses for computers.
>
> Learn to use computers as a tool in education. Develop skills in adopting software for inclusion in lesson plans. Become familiar with available hardware and software, and elements of programming (in Basic).

The need for this course is supported by the fact that 26 of 90 student teachers survey (1986) had not taken a computer course. This is not too surprising since WOSC attracts so many transfer and "certification only*" students. Seventy-two (72) of the 90 student teachers were transfer of post-baccalaurate students. However, many transferred coursework, took additional courses at WOSC, or demonstrated computer literacy in other ways. Students reported learning about computers from sources other than formal coursework. Exactly 1/2 (45) cited family-owned computers, work experience, high school, friends, and even "playing with" and learning from elementary students. The main use of microcomputers by students in courses at WOSC was word processing.

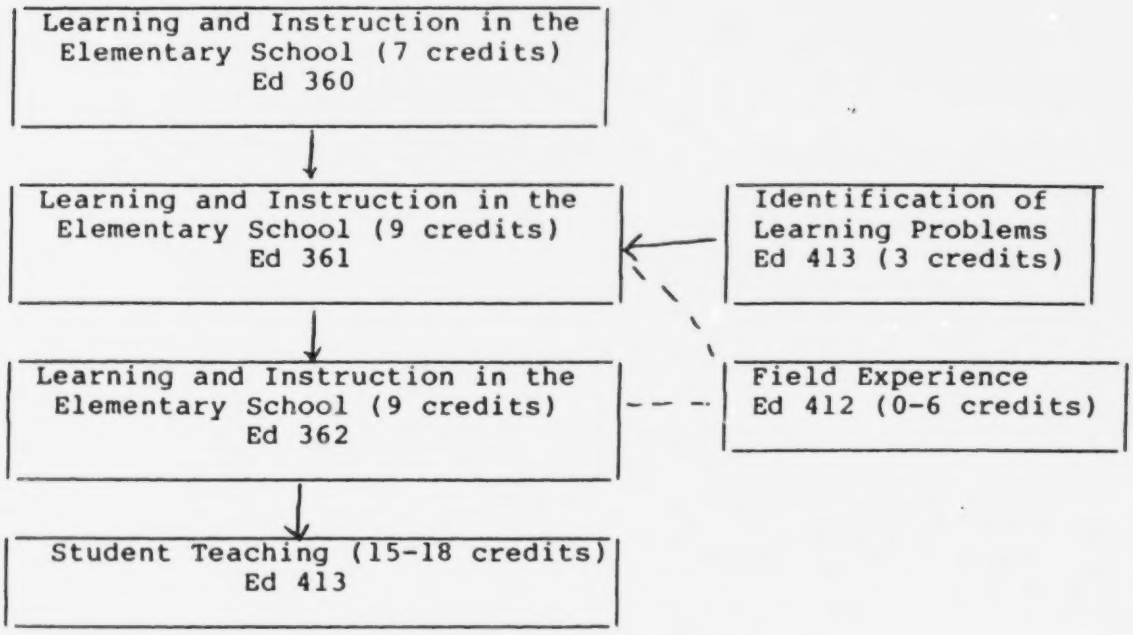
* already have

To summarize, the elementary school curriculum for computer literacy needs direct attention in the teaching specialty area. Not all WOSC certification candidates receive content about what is to be taught to elementary school children about computers. Future revisions of the elementary education curriculum need to address this issue, and provide all candidates with the necessary knowledge to design, implement, or even understand a curriculum for computer literacy as part of the overall issue of technology in teaching.

PROFESSIONAL EDUCATION

The professional education program at WOSC is designed to assist the student in bridging between his function as a student and his perceived function as a teacher. While the initial liberal arts portion of the program aims towards students defining themselves as young adults, the professional education phase is designed to assist the student in translating that perception into the role demands of education, into defining his teaching style, and inter-relating available knowledges, skills, sensitivities, and feelings into an initial level of professional competency.

Practicum experiences in public school settings assume an ever-increasing role in this portion of the program. These experiences assist the student in making decisions about the specific setting in which he wishes to work. Students are afforded opportunities to work with pre-school to middle school-aged children in at least two social settings across the total curriculum.


Learning and Instruction in the Elementary School (7 credits) Ed 360
Learning and Instruction in the Elementary School (9 credits) Ed 361
Identification of Learning Problems Ed 413 (3 credits)
Learning and Instruction in the Elementary School (9 credits) Ed 362
Field Experience Ed 412 (0-6 credits)
Student Teaching (15-18 credits) Ed 413

Professional Education Sequence - WOSC
Department of Elementary Education

The primary source of content in the Professional Education phase of the program is educational psychology, educational methodology, educational media-technology, and related academic disciplines. Such content is offered in conjunction with simulated or "hands-on" experiences in a school setting. An effort has been made to organize instruction in such a way as to insure that the various knowledges, skills and sensitivities obtained through the many separate learning experiences are integrated at a level that permits their effective use in carrying out the functions expected of a teacher in a school. Instruction is organized in such a way as to insure that the various knowledges, skills and sensitivities obtained through such separate learning experiences are integrated at a level that permits their effective use in carrying out the functions expected of a teacher in a school. Such a curriculum pattern is illustrated schematically:

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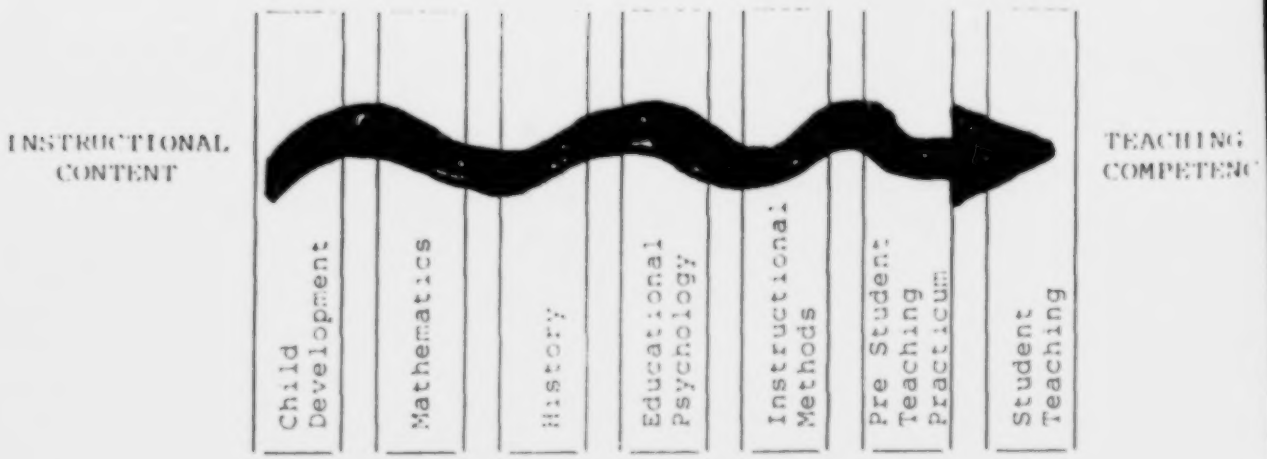

The increasing utilization of computers in educational settings has resulted into another entire content area to be included in professional preparation programs. At WOSC, this content has been infused across the entire range of offerings in required professional education coursework. Objectives established for this area are:

- The student will have experience in using computers in the learning of subject matter.
- The student will be able to integrate effective computerized teaching materials into classroom instructional activities.
- The student will be able to evaluate the appropriateness and effectiveness of infusing computerized materials into the instructional program to meet specific curriculum-based instructional objectives.
- The student will know sources of information on computers in education.

Applications:

- The student will be able to integrate effective computerized teaching materials into classroom instructional activities.

Elementary Block (Ed 360-361-362) precedes the student teaching experience. A variety of instructional models are used to demonstrate to students effective teaching procedures, and conditions that foster learning. The survey of student teachers reported many uses of micro-

computers in block instruction. They were used for simulation activities, drill in word recognition teaching strategies, and for taking tests. Students were required to evaluate instructional software of many types across several curriculum areas. (The majority of the students surveyed had evaluated software.) As a requirement for the media proficiency of block, students are required to write a simple program and execute it.

Students in the second and third terms of block (Ed 361-362) participate in a highly supervised practicum in the public schools. A case study is included in the Appendix detailing with a kindergarten experience. Many exposures to microcomputers occurred during these experiences. All cooperating schools have microcomputers. The WOSC students report a wide-variety of involvement. Many (2/3's) reported seeing microcomputers used by teachers. The types of uses will be discussed later as the student teaching experience is detailed. The effect of modeling deserves mention here. Modeling (or vicarious conditioning) can be an efficient and effective means of teaching a new behavior. Classroom-based research has demonstrated this in both regular and special education classes. Modeling has long been used to teach dance, sports, shop, and other subjects. It also appears to be a key part of teaching computer skills.

The process of modeling deserves considerable attention. We know that modeling can be used to achieve three different effects. First, it can teach a new behavior. Second, it can help encourage or elicit old behaviors. Finally, it may strengthen or weaken certain inhibitions for the purpose of helping students overcome problems like shyness or fear. (Fear is one of the greatest obstacles to computer use faced by both

faculty and students.) Teachers serve as models for the acquisition of a trememdous range of new behaviors. According to Bandura (1977) learning new behavior through observation of someone else may well be more efficient than learning the behavior in other ways. Students observing cooperating school supervisors using, and being comfortable with computers, causes a tremendous ripple effect throughout the curriculum in teacher education.

The student teaching portion of professional education is a complete term in a setting other than the one experienced in elementary block. This exposes the candidate to a different school, often a different grade level, and a different faculty. A wide variety of instructional patterns are thereby experienced. It also provides students another setting whereby computer usage by elementary school teachers and pupils can be observed, and personal computer skills practiced. Students reported actual uses of microcomputers in their various field experiences including student teaching. Management of data was the main use, closely followed by instructional uses--largely drill. One student even reported being able to teach programming. Over one-half of the survey sample observed use of instructional software with elementary pupils in a learning situation. Only a small portion of the survey had the opportunity to observe programs teaching graphics and programming. Over one-third of the survey reported seeing teachers use the microcomputer for record keeping, grading, and other management items during their student teaching.

In summary, WOSC students are exposed to a myriad of computer-related activities during the professional education component of the teacher education program. Participating as students in learning about

microcomputers, learning content on microcomputers, and observing others using microcomputers in teaching contexts is the first step. Then, many students have the opportunity to actually use the computer with elementary pupils in a teaching/learning situation. All students need this opportunity.

Summary

Teacher education is a complex undertaking. Many variables must be considered. Guidelines must be followed. Regulations adhered to! Yet, an over-riding element is the possibility of englarging the ability of prospective teachers to use the tools of the real world. This must be done if the ability to think and act independently is to develop. Schools of the future must prepare students for the information age. A teacher education program should be based on an analysis of the future skills needed, the resources available, and the personal abilities of its candidates. WOSC has attempted to do this in the area of microcomputers in the training of elementary school teachers.

NOTES

1. James Dunaway, "Computer Based Instruction: A Status Report," Streamlined Seminar, National Association of Elementary School Principals, Volume 4, Number 2, 1985, page 1.

2. Communicator, National Association of Elementary School Principals. Volume 9, Number 4, December 1985, page 7.

3. "How Schools Train Kids for Tomorrow's Jobs," U.S. News and World Report. December 23, 2985, Volume 99, Number 26, pp. 44-48.

4. "Survey of the States," Electronic Learning, October 1985.

5. Justine Baker, "Microcomputers in the Classroom," Fastback, Phi Delta Kappa, Number 179, 1982, page 33.

6. A Bandura, Social Learning Theory. Englewood Cliffs, N.J., Prentice Hall, 1977.

APPENDIX

CS 101
Computers & Society

Textbook: Arbib, Computers and the Cybernetic Society, Second Edition

Materials: - floppy disk (available in Computer Lab).
- 100-question Scanton sheets with lettered answers (available at Bookstore).
- Appleworks Wordprocessing Lab Booklet (available in Computer Lab)

Course Goals:

I. Develop an understanding of the computer and its place in society through:

a. Reading the textbook and supplementary materials.
b. Attending class lectures, discussions and demonstrations.
c. Viewing video tapes and computer-aided demonstrations.

II. Learn how to use the microcomputer as a personal tool through:
a. Hands-on experience on a microcomputer.
b. Using a microcomputer as a word processor, spreadsheet and database.

CSE 360 COMPUTER LITERACY FOR TEACHERS

COURSE DESCRIPTION: Survey of instructional uses of computers. Learn to use the computer as a tool in education. Develop skills in adopting software for inclusion in lesson plans. Become familiar with available hardware and software, and elements of programming (in BASIC).

LESSON 1 - THE COMPUTER: ITS IMPACT ON SOCIETY AND ON EDUCATION

An overview of the computer in society and its impact on education.

The changing nature of computing and its use in the classroom.

LESSON 2 - THE MICROCOMPUTER SYSTEM

PART ONE:

Explanation of the equipment involved in a typical microcomputer system and its function in schools.

PART TWO:

Introduction to the APPLE II computer and its operating system, DOS 3.3.

LESSON 3 - A TOOL FOR PROBLEM SOLVING

PART ONE:

Definition of problem solving.

Problem solving strategies and procedures.

Overview of computer programming.

PART TWO:

Introduction to LOGO

Introduction to BASIC

Screen, assignment and data entry commands

LESSON 4 - LEARNING AND COURSEWARE

PART ONE:

Relationships of some learning theories to courseware design.

LESSON 5 - CLASSIFICATION OF COURSEWARE

Definition and classification of educational programs for the computer.

Relationships of courseware to teaching strategies.

LESSON 6 - COMMUNICATION AND COURSEWARE

PART ONE:

Communications and computer-human interaction.

Consideration of how graphics can enhance the presentation of information.

PART TWO:

Instruction in BASIC

Disk commands
Working with strings

LESSON 7 - COURSEWARE EVALUATION

PART ONE:

Identification of the techniques involved in the selection and evaluation of commercial courseware.

Examination of evaluation criteria.

Development of a courseware rating instrument.

PART TWO:

Instruction in BASIC

Loops
Arrays
Subroutines

LESSON 8 - INTEGRATING THE COMPUTER INTO THE CURRICULUM

PART ONE:

Outline of a plan for the infusion of the computer into the curriculum, including suggested strategies for software implementation.

PART TWO:

Introduction in BASIC

- Screen formatting
- Low resolution graphics
- High resolution graphics

LESSON 9 - COMPUTER APPLICATIONS IN THE CLASSROOM

Examination of a unit and lesson plan structure to include effective computer applications.

An explanation of how the computer could be used to support and enhance instruction in a variety of subject areas.

A look at Computer Assisted Video Instruction.

LESSON 10 - MANAGING INFORMATION

Analysis of classroom, school, and district-wide management applications of the computer.

Kindergarten Children and Computers

A Case Study

Keith A. Skarphol

6-11-86

During Spring term of 1986 at Salem Heights Elementary School, I had the opportunity to introduce computers to Kindergarten children. This was my first experience working with computers and young children together.

The setting for this introduction and computer work was in the Salem Heights Media Center and the hallway outside the kindergarten classroom. Distraction didn't seem to be an issue for these children. I worked with a total 54 kindergarten children, 8 have or have had computers at home. The kindergarten students worked 3 to a terminal for 10 minutes per session once a week. Not much exposure for the number of students but most of them knew what day they would be on the computer or asked why we weren't "doing the computer today".

The equipment we used included an Apple IIe with software by the Minnesota Educational Computing Consortium. The software programs included "The Friendly Computer, Elementary K-2," and "Right of Way." The programs dealt specifically with keyboard drills. Students had to be familiar with upper case letters and numerals from 1 to 10.

Children were eager, hesitant and excited to work on the computer. Some students continued working through their recess times. They found that they could make the computer do things. Keyboard drills became fun and easy as their confidence grew. Students wanted to find out what happened if they put in the wrong answer. They also wanted to spell their names, count and play games on the computer. They were beginning to understand that they could make the computer do different things. The kids wanted the computer to talk to them.

We began with keyboard drills to be able to recognize letters and numbers. Following this was a timing drill called Zebug in which students had to find a letter and enter it on the monitor before Zebug crashed. Again some children were apprehensive or even nervous about making an

error. It was as though the computer was an entity that would respond unfavorably to an incorrect response. I tried to establish an atmosphere of experimentation and acceptance. There were no mistakes from my point of view and I made every effort to down play any interaction that made reference to "the wrong answer." Once we moved past this point students became more helpful to one another and encouraged partners verbally with praise.

Student's comments included the following: "It's fun", "I've already done the computer", "It's easy", "I've never done a computer before, I don't know if I can do it", "Can I write my numbers?", "Will it talk?", "Will we play games?", "Can I write my name?", Is it in color?", "What happens if you push the wrong button?", "Can I make it do something different?".

After keyboard drills we tried a game called shapes which required the student to make several choices and follow two successive directions. This was sometimes slow and deliberate and at other times very quick and orderly. Some students follow directions better than others and among the kindergarten class there were at least four readers of first to third grade levels. There was opportunity for structured creativity with the more mature students. They question the function and capability of the computer and although it is at an elementary level the challenge is to know more.

The element of significance to young children is exposure. Kids like to try new things and computers are new to most of them. They are attractive, attention holding devices that use present skills to help develop even newer skills for students. They are almost equal to the experience of excitement associated with reading that first good book. You just know that each succeeding book must somehow get better.

The software that MECC provides allows a student to become familiar and gradually challenges him/her to think in different directions. The

student can start simple and expand rapidly or proceed more slowly building momentum and confidence as he goes onward.

In create a shape, students had to process two directions to make a shape. They had to visually respond to identifying letters and move a dot in a continual direction, change direction by choosing another letter and thus the process and shape is completed. Students made squares, rectangles and triangles in various sizes. Some of the shapes were very small and others covered the entire screen. The knowledge required to do this exercise included identification of upper case letters, basic shapes and that lines could be made in straight (back and forth) and diagonal (corner to corner) directions. They also had to understand the direction an arrow points toward. With these basic skills some students worked independently and then coached others who needed help. The computer is geared to children's learning differences. Students can come to a computer software program and work at their own pace and develop their skills through drills and games that stimulate and challenge the individual without threatening the abilities of lesser students.

One application for the use of computers with young children may be the development of attention span. A child must focus to follow visual directions. The listening skills are also developed as the child interacts with the teacher during the initial instruction. Games that are used to develop these skills are timing drills like Zebug and identification drills like create a shape.

Use for special needs kids would include the confidence and skills building drills. The teacher can choose different levels of difficulty to adjust speed and the number of directions to be followed for a less threatening more controlled pace.

This is a wonderful attention getting device for students who have difficulty focusing visually. They must direct their focus to interact with the computer and this demands their attention and involvement. This

is also a tremendous tool for skill building. It can save the teacher the routine drills of worksheets. It also achieves the repetition of some very necessary skills through the software and does it in a stimulating manner. Once students are familiar with the keyboard and some basic directions, a teacher or parent helper plugs it in, puts in the software and boots the system. You're in business for the kids and they like it. It's challenging and fun and it gives them the opportunity to interact in concete, abstract, tactile and kinesthetic modes. It is my hope that when I teach kindergarten or first grade in my own classroom, that a computer will be present.